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NOT TO FORSEE, BUT TO ENABLE:
The Promise and Pitfalls of Computer Simulations in Operational Planning

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy

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"War Plans cover every aspect of a war, and weave them all into a single operation that must have a single, ultimate objective in which all particular aims are reconciled." — Clausewitz¹

"With many calculations, one can win; with few one cannot. How much less chance of victory has one who makes none at all! By this means I examine the situation and the outcome will be clearly apparent. — Sun Tzu²

"No plan survives first contact with the enemy." — Anonymous

Introduction

While warfare's philosophers and theorists have long asserted the value of planning for war, practitioners have inevitably found military planning a devilishly difficult task. The advent of the communication age has made operational planning more, rather than less, difficult. The complexity of the world situation is increasing while the time available for planning is compressing. Alvin Toffler asserts, "War planners and war preventers alike face unprecedented complexity and uncertainty."³ What is the modern planner to do?

Fortunately for U.S. military planners, the forthcoming generation of computer simulation technology promises to provide powerful new planning tools. Computer simulation systems are currently underused in the operational planning process, primarily because of their many limitations. However, within the next few years, improved computer simulations should help produce plans that are much more in tune with the realities of the battlefield.

My analysis shows that systematic use and integration of computer simulations in the operational planning process will decrease planning time while simultaneously improving the quality of the plans produced. Operational commanders and staffs will be free to focus their brain power and precious time on the *art* of warfare while delegating much of the *science* to advanced computer simulation systems.

Computer simulations are no panacea. They provide only partial solutions to some of planning's current shortfalls and in other, more intractable areas, may be of no help at all.

¹ Clausewitz, 579.

² Sun Tzu, 71.

³ Toffler, 98.

Additionally, to reap the full benefits of what computer simulations have to offer we will need to more thoroughly network them with other automated planning systems. In the end we may even need to redesign our planning processes and products to realize all the benefits that computer simulations can offer.

The Problem with Planning (The Need)

The old colloquialism advises, "If it ain't broke, don't fix it." One might question why we need to add new technology to the planning process that has served us faithfully for a number of decades now.

People who have spent some time doing military planning will tell you, "the one thing you never have enough of is time."⁴ The planning process always expands to fill the time available and there is always more left to do when time expires. Military planning, like most processes affected by the communication age, obeys the new rule, "*If it works, its obsolete.*"⁵ [emphasis in original] Let us look specifically at the factors that are driving our current planning process into obsolescence.

Coping with complexity

One of the commonly held beliefs among U.S. military officers is that the world is a more complicated place since the end of the cold war. Toffler points out that the Soviet Union's fall may be more a symptom than a cause of the complexity we face. He postulates that there are now three basic types of civilizations, classified according to the ways in which they generate wealth and make war, "with agricultural economies at the bottom, smokestack economies in the middle, and knowledge-based, or Third Wave, economies likely, at least for a time, to occupy the top of the global power pyramid."⁶ The effect is an increasingly complex world:

⁴ As stated by Captain (Select) Patrick Toohey numerous times during Joint Military Operations instructions during December 1998 and January 1999 at the Naval War College, Newport, RI.

⁵ Burrus, xvi.

⁶ Toffler, 94.

One predictable result of this will be a radical diversification of the kinds of wars we are likely to confront in the future. It is a military truism that every war is different. But few understand just how varied tomorrow's wars are going to be-and how that increased diversity could complicate future efforts to maintain peace."⁷

The communication age

The communication age has produced an information intensive environment in which time is of the essence, change is endemic and flexibility in planning is essential for success.

Computers and telecommunications technologies are merging to give us the ability to create the Communication Age. Don't confuse information with communication. Technology has given us the ability to accumulate vast quantities of information to the extent that we are now unable to digest it all.⁸

In the business world, two of the new rules for success are: "Make rapid change your best friend" and "Build change into the plan." Following these rules " allows you to become *pre-active* rather than reactive. This is the essential characteristic that differentiates the crisis managers from the opportunity managers."⁹ [emphasis in original]

In the military too, we recognize the need to increase the tempo of our operations and anticipate change in planning. We preach these ideas when we talk about "getting inside the enemy's decision cycle," and "the principle of agility." Joint doctrine discusses the need to include branches and sequels in our planning in order to increase our flexibility and maintain the initiative. Unfortunately, our practice generally falls short of the ideal.

One of the main reasons for the shortfall is that planning is so difficult and time consuming. As a result, we tend to abbreviate our planning process and to rely extensively on intuition (or perhaps wishful thinking) in our evaluation of alternatives.

Analyzing courses of action

Evaluating the adequacy, feasibility and acceptability of a course of action requires fairly detailed estimates of supportability by staff members. Logistics planners for example make extensive

⁷ Toffler, 94-5.

⁸ Burrus, 36.

⁹ Burrus, 24-5.

use of historical information and established formulas to determine how much fuel, ammunition, and other supplies will be required to carry out a proposed course of action. These calculations take time, even when aided by automated tools such as computer spreadsheets and databases. The more potential courses of action a planner wishes to consider, the more time will be required to complete the necessary analysis.

A further difficulty with producing useful staff estimates is that much of the historical data upon which the estimates are based dates back as far as World War II and may, therefore be obsolete. Compounding this problem is the fact that many of the things that now matter in analyzing our strength relative to the enemy are intangibles. As Toffler notes, this shortcoming in our calculations parallels similar problems in the business world:

Just as in the case of obsolete accounting methods in business, military literature is filled with complex, quantitative formulas that attempt to compare forces in terms of their numbers and hardware...But it offers few clues to the increasingly important intangibles...In war, just as in business, the ways in which "value" is measured have fallen behind the new realities.¹⁰

Wargaming courses of action

Once courses of action are developed and analyzed, the next step is to conduct wargaming. This step in planning has been called, "The heart of the commander's estimate process."¹¹ The traditional manual (mental) wargaming process is in fact a low-tech, human-intensive process for simulating the potential outcomes of combat actions. By comparing our plans with what we believe the enemy may do, we hope to gain insight into what might result. In this way we expect to discern which of our proposed courses of action will give us the most "bang for the buck." Armed with this information, we can make a rational decision about which course of action is best.

¹⁰ Toffler, 82-3.

¹¹ Joint Military Operations Department, NWC 4111C, 5-1.

In the absence of time and resource constraints, the ideal method in planning operations would be to analyze **all** conceivable friendly courses of action that might be adequate for accomplishing the mission, feasible to execute and acceptable in their implementation. We would then, ideally, conduct a detailed, exhaustive wargaming process that would compare each friendly course of action against **all** possible enemy courses of action. As a result, we could pick **the best possible** course of action to accomplish our mission. However, the real-world constraint of available planning time ensures that we will always fall short of this ideal.

The current theoretical approach to solving the time problem is to develop a limited number of friendly and enemy courses of action (say three each) and then subject them to detailed wargaming. In practice staffs generally produce the requisite triad of friendly and enemy courses of action. However, they usually find that the tyranny of time prevents more than a simple, cursory comparison process. They may walk through a few key events of the plan in evaluating courses of action or they may further abbreviate the process by intuitively estimating the results of each friendly versus enemy course of action. The result is a process in which a very few possible sequences of events are considered and the potential outcomes are more estimated than understood.

So, we end up with planners trying to understand an increasingly complex and variable situation in less time by decreasing the quantity and quality of their analyses. This combination of factors does not argue well for the results that we expect to attain. As Toffler tells us:

The growing heterogeneity of war will make it vastly more difficult for each country to assess the military strength of its neighbors, friends, or rivals. War planners and war preventers alike face unprecedented complexity and uncertainty.¹²

How will we solve this problem? Adding more planners will do little to improve the situation. In fact, by injecting more people, we are likely to add more confusion than clarity. We must look to technology to make up the difference. Advanced simulation systems are one of the most promising tools available to help solve the planning problem.

¹² Toffler, 98.

The U.S. military's senior leaders are placing great emphasis on the future use of simulation technologies. The former Chairman of the Joint Chiefs of Staff, in his vision for the future — Joint Vision 2010 — predicted the following: "Enhanced modeling and simulation of the battlespace, when coupled to on the ground evaluation with real soldiers, sailors, airmen, and marines, can improve the realism of training, upgrade the levels of day-to-day readiness, and increase our opportunities to test innovative concepts and new strategies."¹³ The Chairman's sentiments on the value of computer simulations are echoed by three of the four Service Chiefs. For example, the Commandant of the Marine Corps says:

We must have leaders who can operate effectively in spite of risks and uncertainty; we can develop these leaders by improving their capacity to identify patterns, seek and select critical information, and make decisions quickly on an intuitive basis. This intuitive-based decision making cycle will be enhanced by extensive investments in education, wargaming and combat simulation activities, and battlefield visualization techniques.¹⁴

Joint Simulation Systems (the Tools):

Decision-makers, both in business and the military, have long realized that computer simulations could provide significant benefits if they could be applied to decision-making processes. Computer scientists and business planners have recognized the potential of applying computer simulations to business decisions for nearly forty years. Similarly, Battilega and Grange noted in the early 1980s, "There is a potential for using computer models in planning combat operations. In practice, it appears little has yet been developed in this direction."¹⁵

The reason for the disparity between theory and practice is the relative immaturity of computer simulation techniques. Let us turn our attention to what is currently available in the realm of computer simulations for military applications.

¹³ Shalikashvili, 30.

¹⁴ Krulak, 13. For further examples see also: Fogelman, 16; and Reimer, 12.

¹⁵ Battilega and Grange, 230.

The state of the art

The use of computer simulations in the military is not new. For decades, computer simulations have been used extensively in training. At one end of the spectrum, simulation systems designed to train weapon system crews and individuals proliferate in all services. For example, flight simulators are a staple of training for aviators in all branches of the armed forces. The cost savings and other benefits of these simulations are well documented. They are however limited in the number of people they can train and by the fact that they are not, for the most part, integrated with other training simulation systems.

At the other extreme, large scale combat simulations like the Army's Corps Battle Simulation (CBS) and the Air Force's Air Warfare Simulation (AWSIM) have been used extensively for several decades to train tactical and operational level commanders and staffs. A major drawback of these computer simulations is that they tend to provide significant realism only at the higher echelons of the training audience.

For example, a CBS-based simulation exercise provides Army brigade and higher level staffs with a fairly realistic experience, but at the cost of requiring hundreds or thousands of troops to run computer equipment and man communication systems to simulate the actions of battalion and lower level elements. For these lower level troops, the exercise is very unrealistic. The cost savings over putting actual forces in the field justify the use of these simulations for training purposes, but the overhead and lack of realism at lower levels of command make them unsuitable for operational level planning in a time and resource constrained environment.

Computer simulations are currently used for planning in some specialized and technically oriented military fields. For example, "USTRANSCOM uses computer simulation to determine transportation feasibility. In turn, the supported commander adjusts TPFDD [time-phased force and deployment database] requirements as necessary to remain within lift capability."¹⁶ Similarly, the Air

¹⁶ U.S. Joint Chiefs of Staff in Joint Pub 5-0, III-7 to III-8.

Force uses computer mission planning systems like the Air Force Mission Support System (AFMSS) to conduct detailed analysis of planned missions, to include terrain and target visualization and expected effects on targets.¹⁷

Each of the services currently uses various computer simulations and models to support analysis of procurement decisions, force structure proposals, and service specific courses of action in various environments. These systems date in vintage from 1960s to 1980s technologies. None of the systems currently available adequately represents the full range of joint operations and capabilities, and the existing computer simulations integrate with each other poorly, if at all.¹⁸

Coming soon to a theater near you

For U.S. military planners, the near future promises the introduction of a new operational planning simulation called the Joint Warfare System (JWARS). Due to begin fielding in fiscal year 2000, JWARS should provide a useful, comprehensive joint simulation to aid operational planners. As conceived, the JWARS system will allow planning staffs at the theater and Joint Task Force (JTF) levels to run their proposed courses of action against a simulated enemy in a computerized environment that considers the effects of terrain and weather in modeling interactions and outcomes.¹⁹ The capabilities of JWARS represents a significant step forward from those of the stovepiped, service specific systems of today.

The Promise

We know that the latest generation of simulation systems is on its way, but what will we do with them? Let us examine in some detail what benefits we as planners can expect to gain by using computer simulations.

¹⁷ Summarized from Biass and Richardson in Armada International, 38-45.

¹⁸ Joint Warfare System Office, JWARS Overview Briefing, slide 5.

¹⁹ For a detailed description of JWARS capabilities, see the JWARS Operational Requirements Document (ORD).

Exploring more options

It is easy to see the desirability, in an increasingly complex world, of exploring a wider range of possibilities both in our own actions and in those of the enemy. The potential courses of action in any planning situation are practically infinite. The odds that planners will figure out precisely what will happen and produce a plan that is completely accurate are approximately nil. However, by looking at a broader range of possibilities, we will increase the odds that what actually transpires will fall within the scope of what we have considered. If the JWARS simulation achieves its design goal of being able to run a detailed computerized wargame of a 100 day long major theater war in 30 minutes of computer time, planners should have time to analyze many more than the current requisite three courses of action. Therefore the plan chosen should be more likely lead to success.

Branches and sequels made easy

We plan our operations based on what we think the enemy is likely to do, with the realization that they may not follow the script we write. If the enemy does something different than what we expect, we may need to modify our plan in order to succeed. This is the logic behind planning branches in our operations. The courses of action we consider in planning but do not choose to implement represent possible branches. If we use computer simulations to wargame the interaction of more friendly and enemy courses of action, we are more apt to find the branch we will need to implement when the enemy does the unexpected.

Sequels are the answer to the question, "what will we do next, once we achieve the goals of our current plan?" If we use a simulation system to understand what the end state of the current operation will be, we are in much better shape to see what follow-on operations will be possible and desirable. Hence we should find ourselves better prepared to take advantage of the situations that present themselves.

Automating staff estimates

Consider the advantages of basing estimates not on generic historical data, but on situational specific data derived from the play of an interactive simulation. By running our proposed course of

action against the enemy's expected action in a detailed simulation, the result should be a much more accurate prediction of what will happen.

For example, we should do better than estimating that an armored division will burn X gallons of fuel and shoot Y rounds of ammunition when conducting a deliberate attack, based on the fact that those numbers were the averages for a division in World War II. By running a computer simulation we should get values based on how far and fast our units will move against the enemy we face on the terrain on which we plan to fight using the specific course of action we have planned.

Realistic wargaming

Proper wargaming requires us to put ourselves inside the mind of our enemy. A common technique is to have members of the intelligence staff play the role of the enemy during the wargaming process. This approach is currently the best available alternative, but it falls short of what a simulation system could provide. If our simulation system accurately represents enemy doctrine and capabilities, we can overcome the potential pitfalls of scripting enemy actions or treating our enemy as a mirror image of ourselves.

The effects of environmental factors like weather as well as the chance elements referred to as "fog and friction"²⁰ are extremely difficult to factor in to our traditional wargaming processes. A common approach is to treat such factors as neutral and ignore them. JWARS will include the capability to factor in weather and to "roll the dice" to determine the outcomes of probabilistic encounters. The improvements to wargaming realism should be dramatic.

Measuring success

The end result of wargaming is the selection of one course of action as best suited to achieve the mission. Doctrine demands that we base our choice on quantifiable criteria known as measures of effectiveness (MOEs). Common MOEs include criteria such as: probability of mission success,

²⁰ Clausewitz, 649.

number of enemy casualties, number of enemy weapon systems destroyed, ratio of friendly to enemy losses, rate of advance, ground gained or lost, etc.²¹

MOEs are difficult to measure directly in our current manual wargaming process. As a substitute, we use crude approximations, such as historical ground force strength ratios. For example, we plan an attack based on a historical 3:1 friendly to enemy ratio required for success. Much of the data used to justify these MOEs is anecdotal and outdated at best.²²

Computer simulations on the other hand, systematically and automatically record the sorts of quantifiable MOEs we need. As a further benefit, they correlate MOEs over time and space. So, for example, a computerized wargame can tell us not only how many casualties we are likely to take, but also when and where they will occur on the battlefield. The benefits of such detailed information in allowing us to synchronize our operations with supporting systems are obvious.

Less obvious, but no less important, is the precision we can achieve using more detailed MOEs. We may find in our computerized wargaming that we can predict and avoid culmination, design courses of action to minimize collateral damage, and even achieve our mission with less death and destruction among both our own and the enemy's forces.

Seeing the plan

As planners develop their courses of action, they attempt to visualize how events will unfold and what the battlespace will look like as the operation progresses. This visualization process requires each planner to "make a little movie in their head"²³ of what will happen. Everyone's movie will necessarily be different. One of the big potential benefits of running our courses of action in a simulation like JWARS is that the simulation system can display events as they unfold in time and space. We now have a movie not in our heads, but in our software. The planning staff can share a common vision of how the operation will progress.

²¹ Battilega and Grange, 38-56.

²² Shaara attributes the 3:1 ratio for attack to General James Longstreet's Civil War experience. See page 134.

²³ The concept of making a movie in one's head was expressed by the character "Finch" on the 10 November (continued on next page)

A further advantage is that each planner can control and customize their view. The JWARS system can be paused to look at specific points in detail. The simulation can fast-forward or rewind to specific points in time. It can zoom in to see fine details or zoom out for the big picture. The potential benefits to our abilities to analyze the situation and troubleshoot problems interactively are enormous.

The Pitfalls

Despite the benefits that computer simulations promise, a number of factors might prevent realizing their true potential in the planning process.

Overcoming technophobia

Many people have traditionally viewed automation of manual processes with a degree of apprehension or fear. In part, this technophobia is a result of misunderstanding and reflects a natural resistance to change. Another part of the problem is real and stems from the way we ask people to interact with computer systems.

One of the first things we must understand is that no simulation — no matter how sophisticated — can make decisions for us. “Decisions are made by people... Computers don’t have judgment. Only human beings have the capacity to sort through the myriad variables involved in complex decision making.”²⁴ Simulation systems, like spreadsheets and databases before them, will empower, but not replace people in the planning process. The bottom line is, “Technology is a tool, not a tyrant.”²⁵

The interface that allows people to interact with a computer system affects how inclined or disinclined they will be to use the system. Consider a couple of examples from the personal computer (PC) revolution. The first PC application to gain broad acceptance in the business world was the spreadsheet. Spreadsheets made computerized accounting worthwhile for the average business user because they made the computerized method of crunching numbers easier and quicker than the

1998 episode of “Just Shoot Me.” Written by Port and Guarascio.

²⁴ Burrus, 105.

²⁵ Burrus, 106.

traditional manual method. Similarly, the "What you see is what you get" (WYSIWYG) word processing interface, pioneered by the Apple Macintosh computer, and widely copied by programmers of other PC systems, broke the code on ease of use. WYSIWYG made computerized word processing worthwhile for the average user because it was finally easier and faster to write with the computer than with the traditional hand written or typewritten method.

The interface for a planning system should be equally easy and intuitive. In the best of all possible worlds, it should be as simple as drawing on a map and filling in an execution matrix. In reality, the computerized technique of entering planning information will differ from the manual methods currently employed. Past computer simulation systems required more time and effort than they were worth from the planning perspective. They fell into the trap of "asking the customer to fit the product rather than making the product fit the customer."²⁶ If computer simulation systems are to be widely accepted and used, they must make the planner's job easier and faster while simultaneously producing superior results as compared to the manual method they replace.

Simulating the last war

A common problem in planning is the tendency to plan for the last war. Computer simulations are, if anything, more prone to this problem than manual planning tools. To make a simulation work, we need an accurate model of the enemy's organization, capabilities, and behavior. The sort of detailed information required to build models comes from a thorough understanding of an enemy's doctrine combined with historical analysis of actual operations. Such detailed information is more readily available for enemies against whom we've recently fought. Much of the information required to model potential future enemies is speculative or unknown.

Thinking smaller

Which potential adversaries we choose to model will affect how useful our computer simulations will be. In the absence of a discernable enemy, planners at all levels have a tendency to

²⁶ Burrus, 206.

scan the environment to see which possible foes look threatening. Because most Americans have a “bigger is better” bias, the tendency is to perceive the largest foreign militaries as the most threatening. This bias may lead us to model the wrong threat. It may also incline us to develop friendly courses of action with larger as opposed to more capable forces. We should heed the warning:

“In the Third Wave system, economies of scale are frequently outweighed by diseconomies of complexity... Problems proliferate that may outweigh any of the presumed benefits of sheer mass. The old idea that bigger is necessarily better is increasingly outmoded.”²⁷

Senior leaders show some inclination to overcome this bias. For example, Army Vision 2010 list among its key concepts: “Mass Effects, Not Forces.”²⁸ Still, engrained ways of thought are not easy to overcome. No planning system can save us from ourselves if we let our prejudices get in the way of exploring unorthodox possibilities.

You don't know what you don't know

To properly develop a plan, we need to know the enemy. This is a challenge that is becoming increasingly more difficult, as Toffler points out: “During the Cold War the enemy was known. Tomorrow it may not even be possible to figure out who the adversary is, exactly as is the case with some terrorist attacks today.”²⁹ The broadening range of possible adversaries, coupled with deliberate attempts by foes to hide their aggressive actions or cast suspicion and blame on others will make this problem more difficult in the future. Again, Toffler: “Imagine, say, a Chinese attack on American satellite communications disguised as the work of Israeli intelligence — or, for that matter, vice-versa.”³⁰

A related complication is our less than perfect understanding of the types of warfare we will be called upon to wage. U.S. forces continue to understand “war” better than they do military operations other than war (MOOTW). At the lower end of the spectrum of violence, the possibilities

²⁷ Toffler, 70.

²⁸ Reimer, 12.

²⁹ Toffler, 121.

³⁰ Toffler, 121.

are much more varied. The actions of individuals and small groups are less predictable and more important than in higher intensity warfare. Additionally, difficult to model psychological aspects of the situation are relatively more important while easier to model physical aspects are relatively less decisive.

In ill-defined situations computer simulations may provide some relief with their power to enable us to examine a broader array of potential enemies and courses of action. Still, computer systems are less capable of dealing with ambiguity than are humans, so they are no panacea for coping with an ambiguous environment.

The role of irrational actors

Building a computerized model of an enemy requires that we determine the policies, procedures and doctrine by which that enemy operates. In computer simulation terms, these decision models are known as "rule sets." All such rule sets assume that people act rationally. The presumption of rationality does not always bear itself out in the real world. Enemies may take actions that are rational within their frame of reference, but which appear utterly irrational to us. Also, truly insane people may gain sufficient power to pose a threat to our interests. The inability to model irrational behavior will remain a significant limitation in any computer simulation system.

Integration

Enabling our joint planning system with computer simulations is only half the battle. To achieve its true potential, the simulation system must integrate with the other automated systems we use to plan and execute operations. Current doctrine for the Joint Operational Planning and Execution System (JOPES) recognizes this requirement:

"Interoperable planning and execution systems are essential to effective planning for joint operations. The activities of the entire planning community must be integrated through an interoperable joint system that provides for uniform policies, procedures, and reporting structures supported by modern communications and computer systems."³¹ [emphasis in original]

³¹ U.S. Joint Chiefs of Staff in Joint Pub 5-0, viii.
(continued on next page)

In those areas where the JOPES process is already automated, our computer simulations should integrate and dynamically exchange information with existing systems. Consider, for example, the time-phased force and deployment database (TPFDD). Since this component of JOPES is already automated, operational planning simulation systems should be able to draw information from and feed it back into the TPFDD. This capability is not currently planned for implementation in JWARS.³² Better integration should be developed in future systems.

Recommendations for the Future

The past several decades have seen a radical transformation in the way we wage war. We have moved from single-service to joint operations. Precision weapons are displacing "dumb" munitions as the tools of choice. Information dominance has emerged as a key concept for success in our knowledge intensive approach to warfare; yet our planning process remains substantially unchanged. Simply splicing computer simulations into the existing process may not provide enough savings in time to allow planning to keep pace with the accelerated tempo of operations. The planning process itself may have to be redesigned to produce the time savings required.

Transmitting mission and intent

By issuing a mission statement, commander's intent, and concept of operations, the commander attempts to help subordinates visualize what he has in mind. In the current planning system this information is generally transmitted in the form of a written order that tries to paint a "word picture." The commander's written words may be accompanied by some map overlays and static diagrams of key points in the operation. Matrices attempt to show how actions and events relate to each other over the course of time.

This system may fail to convey the commander's true intentions. Usually the written order must be refined by subsequent interaction between planners and executors. This interaction may be in

³² Per telephone conversation with Commander Barnes, U.S. Navy Representative to JWARS Office.

person, or it may be done using communication links such as telephones or video teleconferencing. By the time interactive refinement is complete, the original written plan may be virtually obsolete.

Redefining the process

Why not start interactive refinements much earlier in the planning process? Instead of issuing a lengthy written order, imagine instead transmitting an operation plan (OPLAN) or operation order (OPORD) in the form of a dynamic multimedia simulation. Analogous changes in the ways information is passed around in the world around us.

As the medium of printed news has yielded in importance to visually based broadcast journalism, so too may we find that the voluminous, detailed written OPLAN or OPORD gives way to a more interactive, visually based form. The time currently spent writing detailed conceptual descriptions of events and tasks might instead be spent in a collaborative, interactive, visually based multi-echelon planning process. The Services are currently taking some steps in this direction.

“Shaping the battlespace will be facilitated primarily by sharing ‘real time’ information among all Services, allies, and coalition partners.”³³ The Army’s Advanced Warfighting Experiment (AWE) has made some strides in this arena. A recent exercise at the National Training Center featured advanced battlefield planning and visualization (BPV) technology that allowed planning staffs at several levels of command to plan their actions simultaneously and collaboratively, thus saving significant amounts of time while improving mutual understanding of the plan.³⁴

The Marine Corps vision echoes the same sentiments: “Communications systems designed to provide a few headquarters with an overall view of the situation will have to be replaced by those that provide units with control over the information they need.”³⁵ Recent warfighting experiments by the Marines have shown similar promise for information sharing and collaboration in planning.

³³ Reimer, 14.

³⁴ For details, see Valcourt, 16-17.

³⁵ Krulak, 12.

Currently fielded technology does not provide all the tools required for real-time multi-echelon, collaborative planning, but the technology required is available. We may never achieve the nirvana of a paperless planning process, but to the extent that we can move in that direction, we should find that the effort produces substantial gains in both effectiveness and efficiency.

Conclusion

Computer simulations suitable for operational planning are coming our way. How well we use them in our planning processes is up to us. The promise of quicker, more effective operational planning exists, but the way ahead is beset with potential pitfalls. The most successful operational staffs will be those who effectively integrate and exploit computer simulations' capabilities to enhance the operational commander's coup d'oeil.³⁶

In the end, the planning process will never be a crystal ball. However, the application of computer simulation technologies, especially if coupled with proper system integration and changes in the planning process will allow us to approach more closely the ideal expressed by Antoine de Saint-Exupéry: "As for the future, your task is not to foresee, but to enable it."³⁷

³⁶ "When all is said and done, it really is the commander's coup d'oeil, his ability to see things simply, to identify the whole business of war completely with himself, that is the essence of good generalship." Clausewitz, 578.

³⁷ As quoted in Burrus, 321.

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